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ABSTRACT

This paper constitutes a report based on a project reported in full in ED 034 322 to develop and test information systems designed for use by elementary school children in studying world cultures and a set of research studies to explore children's thinking about human society and culture. A data bank was built on the category system of the Human Relations Area Files and multi-media developed about the Pueblo and a New England community. Investigations explored the kinds of questions the children asked, their use of information, the parts of the systems they utilized, and the inquiry characteristics of the children which related to use of the system. Extensive investigation was made of the types of help the children needed to make use of the data banks. It was learned that it is possible to support curriculum in the social studies with information systems presenting various world cultures. It also appears possible to develop a self-administering systems which will present to students cultural problems, which will present them concepts and modes of inquiry from the social sciences, and which will induce them to engage in the exploration of those concepts and the application of those modes of inquiry to the study of cultures and cultural problems. A set of priorities for needed research is included. (Author/VLW)

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Data Banks for the Social Studies

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A Brief Report of a Project
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This paper constitutes a brief report of a project to develop and test information systems designed for use by elementary school children, and a set of research studies to explore children's thinking about human society and culture. There are two main reasons to build information systems - data banks - for young children which will give them access to representative world cultures. The first is to make available to the school child large quantities of information about world societies, and in so doing to develop the technology necessary for building such storage and retrieval systems. The second is to learn what kinds of thinking young children can do about human culture when they have access to a wide spectrum of information about a number of societies.

The work relates to several curricular and instructional problems in the social studies. Part of the effort is directed at the provision of informational support for inductive curricular and instructional strategies. Another part attempts to lay the foundation for learning centers in the social studies. Some of the research is aimed at the development of individualized, self-pacing learning systems controlled and administered by the learners. A fourth is the design of curricular systems intended to lead children toward more complex and abstract ways of analyzing cultures and human problems within them.

Support Systems for Children:

The Idea of Data Banks

A student who wishes to enjoy both freedom and power in regard to his inquiry needs several conditions.

1. He needs to have available to him a wide variety of information from which he can choose those things which he feels are relevant to his search.
2. Sequence should be controlled by the inquirer, and the system should be organized so that he can enter it at any point.
3. Information should be stored in a variety of media which can be used flexibily to suit his capability at the time. In other words, a student with a reading difficulty should not be required to read in order to get information.
4. Information should be stored which is as close to the original source as possible. This prevents the bias of the author or organizer from interfering with the student's inquiry.
5. The system should be set up so that the inquirer can proceed to gain information independently. He should feel that he is in control of his own search.

The first requirement for proceeding with the studies was the creation of a system or data bank which would satisfy the above conditions. Two communities were selected on the basis of availability of material. They were a Pueblo in the

southwestern United States and a town in New England. A wide spectrum of information was gathered on each community and the information was stored in relatively short units. These were organized according to a large category system, the Human Relations Area File, developed by the Yale Department of Anthropology. This permitted random access to the stored material.

The first community which was selected, the Pueblo had not only available material but was a contrast to major themes in American culture. An anthropologist, Charles Lange had studied this community for over twenty years and was willing to make his studies available. Also, this pueblo contained examples of most social studies concepts and showed the impact of two other cultures on its development. The second community, a town in New England, represented the dominant form of European - United States culture.

To make the initial system, the following steps were planned:

1. Selection and modification of a category system.
2. Collection of data representing all possible aspects of the culture.
3. Organization of the data into the category system.
4. Development of visual (pictorial and graphic), auditory (audio tapes), and textual (written) modules for each category.

5. Development of orientation devices for introducing children to the system.
6. Trial of the data bank as a support system for children, with revision of the informational modules and orientation devices as a result.

Trying the System: Initial Studies

The second phase of activity was planned to investigate how children used the storage and retrieval system to answer their own questions and to solve a very general problem related to the Pueblo Culture. Particularly, investigations were designed to explore the kinds of questions the children would ask, their use of information, the parts of the systems they utilized, and the characteristics of the children which related to use of the system. In addition, extensive investigation was made of the types of help the children needed in order to make use of the data banks.

Following are the questions which determined the research after the initial study. They deal with learning patterns in general and with learning about aspects of the social sciences as they affect children in particular.

1. What kinds of cultural comparisons can children make when working with data banks representing two cultures? What are the characteristics of the students that affect

search patterns? Information pertaining to this question is reported in Chapter Seven. In addition, the reported study probed the ability of groups to work on cultural-comparison problems.

2. Does a self-administering instructional unit which presents to the children a system for analysing cultures affect the process by which they compare cultures? What are the characteristics of the children who respond to the instructional unit?

3. How does initiation by the student compare with initiation by the system in terms of the descriptions students make of cultures? Do themes and concepts used to describe the cultures vary as student control over inquiry increases?

4. Can students validate concepts drawn from the social sciences using information from the system? How does the complexity of the concepts affect the process of validation?

5. Can children generate solutions to social problems drawing on the data banks for information about the cultures? What kinds of solutions do they generate? Does practice in solving problems affect the problem-solving process?

6. How does a simplified category system based on children's questions affect behavior by the children as they inquire into a culture? This question was designed as an initial investigation into the affect of the type of category system on the behavior of the student.

The above set of investigations is interpreted in terms of the potential of informational report systems for supporting inquiry by children. It is not the intent of this work to test or justify learner-initiated teaching methods as opposed to other approaches to teaching. The focus is rather on one of the technological aspects of an environment which would facilitate learner-centered teaching--the informational aspect of the environment. Hence the results are interpreted in the form of guidelines for the development of informational support systems and the possibilities for curriculum development in the social studies when informational sypport systems are created.

Relation of the Problem to Social Studies Curriculum and Instruction

In recent studies, Bruner (1960) and Schwab (1961) have contributed to our approach to the social studies. Bruner defines structure as the way things are related by the scholar and feels that structure should be the organizing element of subject matter. Schwab expands this idea to

include the notion that children can discover relationships between ideas for themselves, much as the scholar does.

The application of these themes to instruction in the social studies implies that the major structural ideas used by social scientists be identified and developed in a form that can be introduced to children. It also implies that methods be developed which will help young children form ideas about the relationships among social behaviors--methods which will help them approach the analysis of social problems and topics in social studies by developing, checking and revising hypotheses. The present work contributes to the development of these instructional methods in three ways; by developing data sources that will facilitate inductive learning, by providing research on children's exploratory behavior in the social science domain, and by developing a laboratory for research in children's social science learning.

Some work has been done recently to develop social studies curricular materials for children. Senesh (1961) has been developing materials centered around the teaching of concepts from economics to elementary school children, testing the assumptions that these concepts can be learned by children. Writers for the Educational Development Center Social Studies Project (1965) make the assumption that the

ways of inquiring of social scientists can be taught to children. In the area of science, the American Association for the Advancement of Science writing teams are proceeding and testing the assumption that the processes which scientists use can be successfully taught to the elementary school child. Price and others (1965) in their projects, make a similar assumption vis-avis the social sciences.

On the whole, the new materials have not been tested emphatically, but are subjected to "classroom tryouts." Some progress has been made in the exploratory work of Joyce and Weinberg (1964) and Joyce and Joyce (1965). Joyce and Weinberg found that third and fifth grade children readily were able to find examples of social studies concepts during conversations about their primary groups. Joyce and Joyce found that teaching children to make inferences about values affected the questions the children asked about a previously unstudied society.

Joyce's (1965) analysis of social science education stressed a strategy for elementary school social studies which is made up of the following elements:

1. Depth studies in whcih children explore topics to the point where they obtain sufficient data to build and test concepts and inquiry styles of their own.
2. An emphasis on social science concepts as controllers of inquiry, as tentative representations of an elusive

reality; hence, to be taught as emerging "windows on the world,"rather than as the conclusions of inquiry.

3. An emphasis on the ways the scholar produces knowledge and checks ideas.

The development of a data storage and retrieval system as a setting for teaching capitalizes on the above work by:

1. Enabling exploration of learner-centered teaching strategies where the learner has immediate access to a much larger data supply than is ordinarily the case.
2. Enabling immediate observation of the uses the child makes of information he retrieves in solving a problem or pursuing a question.
3. Enabling relatively immediate observation of the effects which social science concepts and modes of inquiry have on the child's problem-solving behavior. In one study reported herein a specific investigation is made of this type of question.

Development of the Data Banks:
The Creation of La Stella

The central activity of this project was the development of data storage and retrieval systems based on exemplar cultures which could support children's inquiry into social life.

The data bank representing the Pueblo community was developed first and illustrates the chief stages which were involved:

1. Selection of a category system to function as a base for storing and retrieving data.
2. Collection of data sources relating to the community.
3. Development of data units or modules containing data relevant to the categories in a form useable by children.
4. Informal tryouts of the system followed by revision of procedures and materials.
5. Development of self-administering system elements that orient children and teach them to handle components and audio-visual devices.

We decided to use a very broad category system: the Index to the Human Relations Area Files. This contains 88 major and 629 sub-categories, and covers practically all aspects of culture, physical, social, and spiritual. Since it is so broad, it enables students to enter at any point in the culture and also offers the more sophisticated student a chance to analyze a comprehensive classification system.

Having selected the Pueblo, we proceeded to identify sources of data concerning it. So many sources turned out to be available that we shall deal with most of them only generally.

1. Charles Lange, of the Anthropology Department at Southern Illinois University not only has written a comprehensive analysis (Lange, 1955) of the Pueblo, largely based on his original research. In addition to his published work, he led us to many other sources and permitted us the use of many of his pictures, taken during his years of field work.
2. A recent economic analysis of the Pueblo, prepared by a management consultant firm, leads to contemporary resources on nearly all aspects of contemporary economic and political life.
3. The Heye Foundation's Museum of the American Indian proved an excellent source of information about artifacts, pictures, and manuscript material.
4. The Smithsonian Institute proved to have manuscripts from anthropologists of the nineteenth century and in addition turned out to have a large collection of pictures taken in the nineteenth century by anthropologists and other observers. The pictures proved to be an exceptionally valuable resource, for they included many aspects of life before the time of great intersection with mainstream American culture.
5. Spanish records and books on the Spanish occupation proved to be numerous, but information about the Spanish ear was abundant in some cultural areas and meager in others.

6. Frijoles Canyon in Bandolier National Park is a fertile source of archeological evidence about life in pre-Columbian times.

In addition to the above, hundreds of monographs, books, and pamplets were consulted and numerous personnel from Mexican and government agencies, and the Pueblos themselves, provided documentary sources. We visited the Pueblos and made numerous pictures and made observations of life there.

Transforming Documents

The documentary evidence about pueblo life consisted of pictures, written material, graphs, charts, and maps. The material was culled, reworked, and classified into area file categories. The hundreds of pictures, for example, were classified. Written material was rewritten. Statistical data was placed in charts. Written passages were constructed to accompany pictures, charts, and maps. All of this was rewritten to stay as close as possible to the original sources.

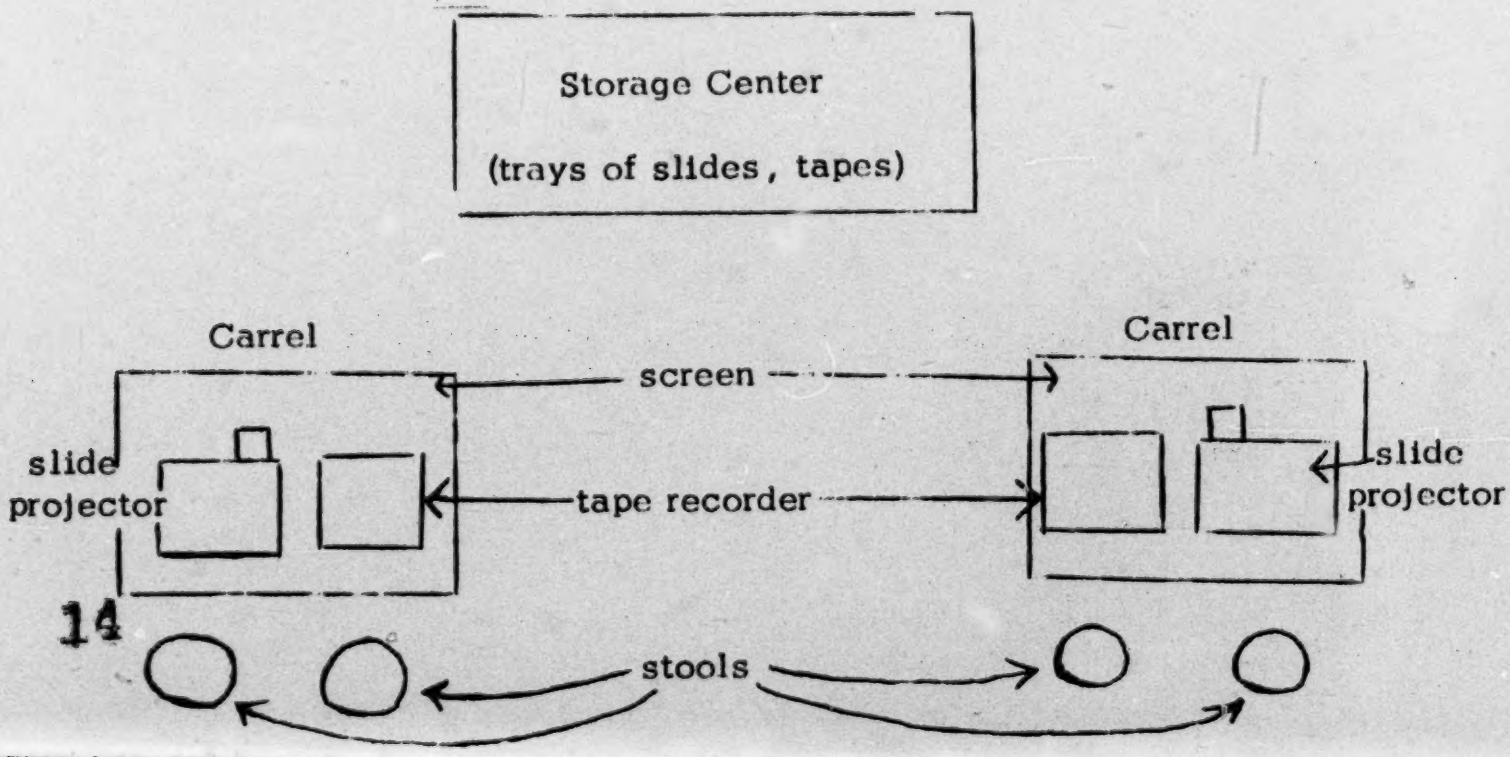
There was one kind of information, however, where the writers deliberately used fictional techniques in an attempt to preserve authenticity of data. To illustrate history, certain political processes, and certain processes of socialization and family life, anecdotes were dramatized. The dramatizations were made as authentic as possible and were used to illustrate processes which were otherwise

hard to convey. Only a few dramatizations were made, and these were done to experiment with the technique. Throughout these, we came to believe that the technique, although not without its difficulties, has great promise for transmitting information about social processes.

Productions of Slides and Tapes

At this point the entire mass of material was photographed and reduced to 35 millimeter slides. All written material for each area file was then taperecorded so that youngsters who could not read the material effectively could listen to it. The slides were placed in storage trays, and the tapes were numbered consecutively and placed nearby.

Large maps of the Pueblo, displays of pictures and artifacts, and posters were prepared. Carrels were built to hold tape recorders, slide projectors, a small projection screen, a small map and room to write. The environment thus created can be mapped thus:



The same developmental sequence was followed to build the "Prestonport" bank, based on an American town. The two banks formed the laboratory for the studies which follow.

The Studies in General

Nine studies made up the research endeavor employing the data banks. These were devised in an effort to obtain information about children's use of information systems, to create guidelines for future information systems, and to discover ways information - retrieval laboratories can serve as a setting for reasearch into the social science education of children.

Two schools in Connecticut were the source of subjects for these studies. The Broad River School, in Norwalk, Connecticut was the setting for research employing stratified samples of children, with socio-economic factors and academic factors being the definers of the strata. The schools in Wilton, Connecticut were used in depth studies where small groups of children were involved, and where demographic variables were not important.

The entire research program consists of eight investigations, several of which have sub-categories or contain subordinate studies.

These initial studies were designed to learn as much as possible about the specifc processes of inquiry by the individual students. Therefore, in these investigations, the students either worked alone or in small groups.

The First Study: The Free Inquiry Task

Over one hundred second, fourth, and sixth grade students participated in this study which consisted of individual administration of the "free inquiry" task ("Learn about the culture until you feel ready to teach another child about it.") The study explored the number and kind of questions asked, relation between input and output measures, and grade, achievement, intelligence, socio-economic status, and reading ability as variables influencing performance. An important outcome was the finding that nearly all the children's questions could be translated into area file categories--a finding that persisted throughout the investigations and was undoubtedly due to the comprehensiveness of the Human Relations Area File Index. In many ways the most interesting data resulted from classifying the content of the questions, providing a graphic description of the kinds of questions children ask when inquiring into a culture.

The Second Study: The Business Task

Students participating in this study were ninety sixth, fourth, and third grade students, again a stratified sample. In addition, the fourth and sixth grade students were

matched with their counterparts from the Free Inquiry Study, enabling comparison of performance under the two task conditions. The same questions were explored as in the Free Inquiry task, with the additional questions of comparison and the examination of the relatedness of input and output to the more specific conditions of the task.

The Third Study: Groups in Action

The students participating in this study had completed the free inquiry task. They worked in groups selected to enable us to observe what happened when various combinations of students were grouped together. (As when "high searchers" were grouped together or mixed with "low searchers.") In addition, the task was a "cultural comparison" task, involving the use of two data banks (the Pueblo and the "typical" American town), enabling the examination of Input and Output variables when cultural comparison was asked.

In this study, also, a self-administering system (the "Question Stimulation") was tried out which presented to the students a set of questions for studying cultures and, with the groups matched, the effects of the question stimulator were observed in terms of Input and Output behavior by the groups of students.

The Fourth Study: Student Inquiry vs. System Initiation

The fourth study was designed to begin what we hope will be a long series of investigations into the dimensions of pupil and system control within curricular systems utilizing information sources of the kind we have developed. In this study the matched pairs of students were "yoked" in a design suggested to us by David E. Hunt of the Ontario Institute for Studies in Education. One group of students inquired under free inquiry task conditions and their matches received the input that the free inquirers generated. The output for both groups was compared. This investigation not only deals with the controversial area of "inquiry" and "expository" methods in education; but, more important, it begins investigations which should yield us knowledge about the kinds of outcomes which are affected by learner and systems control so that we can begin to search for optimal combinations with respect to various kinds of educational goals.

The Fifth Study: Validation of Social Science Concepts

One of the most important potential uses of the data storage and retrieval systems is as a setting for the teaching of the modes of inquiry and the concepts of the social sciences. The fifth study again began what we hope will be another long series of investigations which should begin to provide us with a kind of "map" of the types of social science concepts that the children of various ages and characteristics are

able to deal with. Ten social science concepts were identified and organized according to a criterion of "complexity," which refers to the approximate number of factors involved in the concept, and the number of inferences that it is necessary to make in order to deal with the concept. The ten concepts were then presented to students who were asked to find out whether the concepts held true in the two cultures represented by the data banks. The students then made tape recordings--side two-- of their answers, and they were interviewed to determine the evidence that they could cite for the answers that they gave. Third and fifth grade students from the middle class school engaged in the study.

The Sixth Study: Solving Social Problems

One of the serious questions in the development of a social studies curriculum system is the extent to which children are able to intellectualize and strategize social problems. An equally interesting question is whether or not we are able to affect the kinds of solutions that children will generate as they attempt to come to grips with social problems and, particularly, whether we are able to develop self-administering systems. In the sixth study, both of these questions were approached. A group of children were presented with social problems drawn from the Prestonport town. Half of the students then studied the Pueblo culture under free inquiry conditions, while the other

half engaged in a further solution of cultural problems drawn from the pueblo culture. Both groups of children then were presented with problems drawn from the Prestonport culture and two questions were explored. One was whether the treatment, that is simply exposing children to the task of solving cultural problems, had any effect on the types of solutions they generated. Second, an analysis was made of whether the children in both groups were able to approach and strategize solutions to the different types of cultural problems represented by our choice.

The Seventh Study: Reorganizing the Category Syste

One of the important questions in the development of an information system is the selection of the category system. This is another area which will obviously require a great number of investigations before one can come up with any concept of "optimality." In the seventh investigation two treatment groups entered the system under the free inquiry condition. One of the groups utilized the large category system, which was constructed logically to make comparative studies in anthropology a reality. The second group entered a much shortened category system, only about 35 categories compared with over 600 for the original system. Moreover, the shorter number of categories were based on an analysis of the most frequently-asked questions by children in the prior studies. Hence, the investigation looked not only at a short category system, but one which was

developed specifically to yield to the questioning patterns of children. Output was a particular focus of the study as we sought to explore whether the description of the culture varied significantly with the change in category system.

The Eighth Study: Help Needed by the Children

Embedded in all the other studies was a continuous pattern of data collections designed to determine the kinds of help children needed as they completed each task and whether the tape recordings which had been designed to overcome reading difficulties functioned effectively. Each time a research assistant helped a youngster in any way, he filled out a form called the "aid given form" in which he noted the kind of help he gave and whether he or the student had initiated the contact. Use of the tape was recorded also, under all the task conditions.

These data were tabulated for all of the studies and were examined expecially closely when engineering changes were made in the system, as in the case of the seventh study when a new category system was employed. The results begin the development of a base of knowledge from which we can begin to construct support systems within the data bank to provide the help that children actually need.

The Ninth Study: Children's Preference for Task Structure

This investigation was designed after the pilot study in which it was determined that some students appeared to prefer

the looser structure of the free inquiry task to the somewhat more directional structure of the business task and other similar tasks.

The study used a counterbalanced design in which matched groups of children engaged first in one task, and then the other, in an effort to determine whether the change in task affected performance. This design was seriously flawed in that the experience in one of the tasks seriously affected their behavior in the second task, and the measures we employed could not separate the two. Fortunately, however, the results give some very clear indications about how an investigation of this important kind of factor can be carried on, thus opening up a set of investigations into what might be called "teaching style" and"learning style."

The Total Design Package

It can be seen that all of the studeis utilized a fairly limited method for collecting data which resulted in quantifiable measures of what we defined as "input" and "output.' Otherwise the studies can be seen to fall into a number of categories when one takes the long view of curriculum development in the social studies. In the first case, some of them begin to lay a general empirical base

of what children are like as question-askers and describers of culture under different types of task conditions. The free inquiry task, the problem-solving tasks, the concepts validation tasks, the business task, the cross-cultural task and so on, when the results are taken together, begin to give us some idea of the kinds of questions children ask when they study cultures and the kinds of items they select when they are asked to make descriptions of the cultures they have been studying. Second, the pattern of studies begin to probe into the questions of teaching the concepts and modes of inquiry of the social sciences when extensive information systems are available to the children. Particularly, the problem-solving studies, the studies of concept validation, and the studies in the use of the question-stimulator, all begin to give us some idea of children's ability to approach problems, to approach concepts, and to respond when tasks or instruction lead them into more sophisticated analyses than they ordinarily engage in by themselves. The third category is what we might call purely engineering studies. They deal with questions like: What is the effect of the task structure? What is the effect of a change in the category system? What is the effect of self-administering units which present problems to students? What is the effect of a program which asks students

to solve cultural problems? What kinds of help do students need? What kinds of assistance do they need to have with reading? How long do they search and under what conditions?

Because this was a developmental effort and the investigations were the first conducted in the particular kinds of setting utilized here, it is the third category of studies (the engineering studies) which are actually the most complete. They provide, even at this stage, guidelines for the development of primitive data banks for children. The other investigations, while they begin to give us some idea of children's modes of questioning and of ways of effecting these by teaching them the modes of the social scientist, are a very early stage of investigation, and must be followed up before we will have firm knowledge on those important questions.

Although the reader will have to judge for himself the meaning of the patterns of the investigations and the utility of the results which we obtained, we should probably express our bias here. That is, it will take a great many empirical investigations to lay any kind of scientific base on which curriculum development in the social studies can proceed rationally. However, the data banks affected the behavior of the children far more significantly than we had anticipated. We knew that there had to be some effect on the children of providing them with such comprehensive

information sources. However, we had no idea that the effect would be as significant, or that we would learn so much from this initial series of studies. While the total effort is modest, the impact on us as investigators and developers of social studies curriculums has been substantial.

STUDIES IN DEPTH

The First Study - The Free Inquiry Task

Two studies will be reported here to represent the general procedures of the studies and their purposes. The initial study was designed to find out what children would do with the data bank under very unstructured conditions. Ninety children, working as individuals, participated in the study. The ninety came equally from the second, fourth and sixth grades of the Broad River School and represented a wide range of intelligence and social backgrounds. All the children of each grade were divided into pairs matched by intelligence and the socio-economic status of their parents. Thirty pairs were chosen randomly from all the pairs. Then the members of each pair were randomly assigned as paricipants for the "free inquiry" study and the second study, the "business" task.

The research assistant met with each of the ninety participants. She provided him with the orientation slides and tape, and introduced him to the use of the tape recorder and slide projector. She gave him any help he needed and recorded it on the Aid Given forms. Then he was presented with his task - that of learning about the Pueblo until he thought he could teach someone else about it. To get his information, he asked questions, which the attendant translated in Area File categories and a list of slides pertaining to them. The child retrieved his slides and showed them to himself on the side projector. If he wished, he also listened to the tapes which accompanied all the textual material.

The students worked in this way for about an hour each day until they felt they were ready to complete their task. Then they were given a blank tape on which he recorded for another child describing the Pueblo. This recording was analyzed and the product of the analysis is referred to as the "output" from the task.

The first four hundred questions the students asked were recorded in terms of frequencies of the area file categories.

TABLE ONE

CLASSIFICATION OF 400 QUESTIONS BY

AREA FILE CATEGORIES

Area	Frequency
Geography, Topography, and Climate	25
Housing and Buildings	50
Transport	27
Games and Recreation	31
Clothing and Costume	38
Food and Water	47
Handicrafts	22
History	21
Tools and Equipment	19
Schools and Education	18
Work and Livelihood	16
Religion	14
Dances	13
Warfare	12
Holidays and Ceremonies	9
Other	38
	400

About three--fourths of the questions dealt with relatively "tangible" aspects of culture--buildings, clothing, etc., with the other pertaining to less tangible aspects.

The Frequency of Questions and Categories

In Table Two there are presented the mean number of questions asked by the second, fourth, and sixth grade students during the Free Inquiry Task.

TABLE TWO

MEAN NUMBER OF QUESTIONS ASKED BY SECOND, FOURTH, AND SIXTH GRADE STUDENTS IN THE FREE INQUIRY TASK

	Grade 2	Grade 4	Grade 6
Mean	2.570	8.209	8.762
SD	2.14	2.891	3.106
Difference Between Means of Adjoinging Grades		6.639	0.553
t value of difference		9.14 (.001)	.774 (.441)

The means for grades four and six were close--the difference did not approach significance. However, the grade two mean was much less. In fact, the average frequency was so low that we doubt that more than a half dozen of the second grade

children were using the system effectively. Because of this, third graders were included in the business task which is reported in the next chapter in an effort to find out whether they would be able to use the system more efficiently.

The students' output tapes were described in terms of number and type of themes generated and concepts supporting those themes.

TABLE THREE

OUTPUT BY GRADE: MEANS OF THEMES AND CONCEPTS GENERATED

	Grade 2	Grade 4	Grade 6
N	30	43	35
Themes:			
Mean	5.933	12.429	10.881
SD	4.213	7.237	3.710
Mean differences between adjoining grade	6.469	1.548	
t values (significance)	6.191[1] ($p<.001$)	1.209[1] ($p<.23$)	
Concepts:			
Mean	0.700	3.371	2.310
SD	0.813	3.812	2.170
Mean differences between adjoinging grades	2.671[1]	1.062[1]	
t values (significance)	4.650 ($p<.001$)	1.539 ($p<.13$)	

[1]Variances not assumed equal. Welch's correction was used.

The Grade Two means are substantially below those of the other two grades, and the Second graders were able to generate only a few concepts. But they were able to transform the data they received into quite a number of themes.

The really striking feature of the data, however, is the lack of differences between the fourth and sixth grade. More striking is the fact that the fourth grade students were so much more variable than the sixth grade students in both themes and concepts generated, and that the difference in concepts almost reached the level of significance.

These findings accord with the informal observations by the research assistants working with the students at Broad River School. In that school, especially in the Free Inquiry Task, the greatest enthusiasm appeared to be manifested by fourth grade children. This was not so true of some of the other tasks nor was it true of the students within the more completely middle-class school in the other suburban community.

The data also reveal that the number of themes which were generated at all grade levels was much less than the number of concepts which were developed to support the data. Most of the output tapes were additive rather than conceptual in style. That is, students frequently "strung together" one theme after another, rather than making a conceptualized description of the culture. Because the conceptual property of output did not increase over the grades, we may conjecture that an important research effort should explore ways of teaching children how to conceptualize cultures.

Summary: The Free Inquiry Task

The Free Inquiry Task was designed to gain insight into the ways children engaged in an unstructured task. The result of their questioning and their output indicated that the system was, on the whole, too difficult for all but the most privileged second graders. Starting with the third graders, however, children from wide-ranging socio-economic backgrounds were able to learn from it, and bring enthusiasm to the process. A major effort needs to be made in the future to discover how to lead children from the more concrete aspects of the culture to the more abstract. Although the children were able to translate the data they received into many tangible descriptions, their descriptions were on the whole unconceptual in character. Much research is needed to determine what specifically can be done to help elementary school children become more adequately conceptual in their cultural analysis.

Intelligence and reading ability was found not to be related either to input or output. And although the support system was not entirely free of social class variables, it was freer from these than the ordinary mass instructional system.

The Third Study: Groups in Action: The Effects of the "Question Stimulator"

This investigation was conducted in an effort to explore the effects of two indipendent variables on the inquiry of students in a task requiring them to compare two cultures. The study took place in a setting which included the "La Stella" storage and retrieval system based on the pueblo culture and the "Prestonport" system, which was based on a New England town. The task asked the students to attempt to compare and contrast the two cultures. The design of the study permitted the investigation of two independent variables. One was group composition. The investigation organized the students into groups which were made up in terms of performance on the free inquiry task. The second was the effects of a "question stimulator", which was a self-administering tape-slide instructional unit designed to teach the students some of the questions that social scientists use when they are comparing various aspects of cultures. The investigation thus adds three elements to the studies reported in the earlier chapters. One is the performance of the students in cultural comparison tasks. The second is the effects of the question stimulator. The third is the behavior of the students when they work in groups of known composition as they withdraw and utilize information from the data storage and retrieval systems.

The groups of fourth and sixth graders were made up of high searchers, low searchers, and mixed searchers and average searchers as based on the students' performance on the Free Inquiry Task. Then the groups were matched and only assigned to two treatment units. One treatment unit received the question stimulator prior to engaging in the cultural comparison task. The remainder simply proceeded with the task. In addition, third grade students engaged in the culture cojparison task as individuals, but they were divided into two matched groups, one group of which received the question stimulator prior to engaging in the cultural comparison task.

By dividing the students into groups, we reduced sample size to the point where some comparisons cannot be made with confidence. On the other hand, it seemed very desirable to observe how youngsters would utilize the systems as they worked in groups and to make a determination of the kinds of adjustments that might be necessary in order to prepare information systems that would adequately meet the needs of groups as well as individuals. Also, it is important to get some notion about what happens to a high searcher when he is paired with low searchers, and vice versa, so that we can begin to formulate investigations to pin down the effects that individuals have on each other with respect to information retrieval and usage and with respect to their patterns of

interaction. Hence, we developed the rather clumsy design which probably attempted too much, but which resulted in a considerable yield of ideas which need to be investigated one by one.

The Effects of the "Question Stimulator"

The data collected during the study were similar to those collected during the free inquiry task and the business task. The number of questions and categories were recorded and analyzed for content. The groups made tapes comparing the two cultures at the conclusion of the task and these were analyzed in terms of themes and concepts.

In general, the results indicate that students were able to take hold of the cultural comparison tasks. They asked questions, withdrew information from the two data storage and retrieval systems, and attempted to put those data together and draw conclusions about similarities and differences within the two cultures. Requests for aid were relatively few. In fact, aid-given was of extremely low frequency, compared with tasks in which students worked alone, evidently because if one student had difficulty in finding slides he could turn to his peers rather than to the attendants. As will be seen presently, cultures were compared on many different grounds.

For strictly engineering purposes, it is worth noting that all three of the tasks: the free inquiry task, the business task, and the cultural comparison task, presented to students through self-instructional tape-slide units, appeared to be possible with the children. That is, after simply administering the orientation units to themselves, and then the task presentation units, students were able to begin work and were able to work together till the conclusion of the tasks, with a small amount of help from attendants. Although the matter needs further investigation, it would appear that data storage and retrieval systems of this type, combined with self-administering orientation materials and task presentation units, can provide children with a relatively autonomous learning environment.

Table Four present data comparing the means of the groups which received the question stimulator and those that did not receive the question stimulator with respect to the input and output variables.

TABLE FOUR

GROUPS RECEIVING AND NOT RECEIVING THE QUESTION STIMULATOR: COMPARISON OF MEANS OF INPUT AND OUTPUT VARIABLES (Grades Four and Six)

	With Question Stimulator	Without Question Stimulator	Difference	t Value (Significance)
Questions Asked				
M	7.30	5.80	1.50	1.869 (p=.10)
Categories Searched				
M	18.66	13.63	5.03	2.531 (p=.05)
Themes Generated				
M	11.41	15.27	-3.86	-0.663 (NS)
Concepts Developed				
M	4.08	4.54	-0.46	-0.076 (NS)

It can be seen that there was a significant difference in categories searched and a nearly significant difference in number of questions asked in favor of the groups which received the questions stimulator. There were no significant differences with respect to the output variables although themes generated showed very high variability and a non-significant difference in means in the direction opposite to that which was expected.

The question-stimulator was tested as a crude prototype of self-administering instructional systems which could be used in combination with the data banks to help teach students how social scientists go about cultural analysis. The results here encourage further exploration in the development of such systems.

The output of the groups was coded as was done with the Free Inquiry Task. The content of the tapes did not vary appreciably. It is worth noting that the children compared the cultures on the same bases they had used in the Free Inquiry and the Business Tasks. The tangible, surface aspects of cultures predominated at all grades.

TABLE FIVE

GROUP COMPOSITION AND MEANS OF INPUT AND OUTPUT VARIABLES IN CULTURAL COMPARISON TASK

	Questions	Categories	Themes	Concepts
High Searchers (4 Groups)	8.3	23.5	15.5	8.0
Low Searchers (4 Groups)	5.7	9.7	13.0	2.75
Mixed Searchers (3 Groups)	5.3	14.3	11.7	1.30
Average Searchers (12 Groups)	6.4	16.6	12.9	4.3

In Table Five the means of the input and output variables are presented for the four groups. No statistical comparison is made because of the very small size of the group and the very large number of factors which might have resulted in differences.

We would make the prediction that high searchers, working together, would exceed the other groups and it appears that they did so. The other three groups seem about equal. And the groups of mixed searchers did not show the effect of having a high searchers among them.

The groups were observed during their inquiry to discover whether one child dominated. This was found to be true in only four of the groups. Although the children had had no previous experience, they were able to engage in some debate, and eleven of the groups there was some serious discussion over the nature of the cultural comparison and discussion was made of the value of the differences.

We are encouraged to believe that it is quite possible to build instructional systems in which groups of children study questions and problems some of which are posed to them externally and some of which they generate themselves, but under conditions in which debate and dialogue are important.

Considerable study is needed of the kinds of help that can be provided to children to enable them to engage in dialogue more effectively, of the effects of group composition, and ways of helping them develop their own leadership.

Summary

The results indicate that third, fourth, and sixth grade students were able to handle the cultural comparison task, that is, they were able to seek cultural information and to make comparisons of life in the two communities. The question stimulator itself affected the number of questions asked and the number of categories searched. However, it did not affect the output in terms of dealing with more intangible aspects of culture. Group composition may be an important variable and should be studied within the rather precisely defined parameters of the data storage and retrieval systems to develop guidelines for the creation of effective self-instructional groups.

Interpreting the Results: Curriculum Development in the Social Studies

We have reported here in some detail two of the studies which employ data banks as the tool for research in the

social studies. The other studies are contained in the report for the U.S. Department of Health, Education, and Welfare under Contract No. OEC-1-6-061369-0684, Project No. 6-1369, Data Banks for Children: Development and Initial Studies, April 1969.

From these initial studies we have learned that it appears possible to support curriculum in the social studies with information systems presenting various world cultures. It also appears possible to develop self-administering systems which will present to students cultural problems, which will present to them concepts and modes of inquiry from the social sciences, and which will induce them to engage in the exploration of those concepts and the application of those modes of inquiry to the study of cultures and cultural problems.

However, much work needs to be done. The children did not actively engage in any aspects but the most superficial and simplest of the culture. They also had difficulty relating to each other over social concepts and problems. As with the tapes of individual students, most of the group discussions were additive rather than integrative of interactive.

Research to be Done: A Set of Priorities

Because it seems important to teach children how to apply social science concepts and modes of inquiry to social

problems, we need to discover what concepts can be introduced to children, and at what age. Also we need to teach children more complex and productive cultural solutions, and to learn to build curricular systems on such a basis.

The Data Storage and Retrieval System setting is ideal for research in the complexity of varying learning styles. Through such a setting we can in the future develop ways of molding curricular systems to the characteristics of the children. Task structure, task complexity, amount of support given, the kinds of organizing units given, the kinds of orientation, the kinds of category systems, the kinds of instruction given previous to inquiry--all these can be varied within reasonably narrow limits to produce a set of investigations on which such an engineering venture can be carried out. Also the work begun in the fifth study, Validation of Social Science Concepts, needs to be extended to develop a map of the social science concepts that children of differing ages and other characteristics can handle, so that we can build curricular systems that will adapt to the conceptual complexity level of the students.

It may be possible in the final analysis to engineer curricular systems consisting of components which: (1) provide conceptual input to students, that is which teach them concepts and modes of inquiry from the social sciences; (2) components which pose important cultural problems to

them and induce them to attempt to generate solutions to those problems; and (3) information systems on which they can test out the concepts and modes of inquiry from the social sciences and which they can use are important as the informational basis on which to try generating cultural solutions. If we see culture as a set of solutions to problems, and if we see the dilemmas of today as the need for the generation of new cultural solutions, then it makes good sense not to teach this generation of students simply the kinds of solutions that we have been using in the past, but to build curricular systems on which they can generate fresh solutions and develop the commitment to implement them for the improvement of the conditions under which human kind must live.